2/27/18 "Mistakes are the portal of Discovery." - James Joyce

HW: "Function Notation" HW
Test 2 on Friday 3/9

AIM: How do we evaluate functions?

Warm Up:

$x \neq -2$

1) Express in simplest form, along with restrictions: $\dfrac{\dfrac{x}{x+2}}{1-\dfrac{x}{x+2}}$

$\dfrac{x}{x+2} \to \dfrac{x}{x+2}$

$\dfrac{1}{1} - \dfrac{x}{x+2} = \dfrac{x+2}{x+2} - \dfrac{x}{x+2} = \dfrac{2}{x+2}$

$$\frac{x}{\cancel{x+2}} \cdot \frac{\cancel{x+2}}{2} = \frac{x}{2}$$

FUNCTION NOTATION

$$y = f\ (x)$$

Output → y Rule → f Input → x

***Exercise* #1:** Evaluate each of the following given the function definitions and input values.

(a) $f(x) = 5x - 2$

$f(3) = 5(3) - 2 = 13$

$f(-2) = 5(-2) - 2 = -12$

$f(x+1) = 5(x+1) - 2$

$= 5x + 5 - 2$

$\boxed{= 5x + 3}$

(b) $g(x) = x^2 + 4$

$g(3) = (3)^2 + 4 = 13$

$g(0) = (0)^2 + 4 = 4$

$g(a-2) =$

$= (a-2)^2 + 4$

$= a^2 - 4a + 4 + 4$

$\boxed{a^2 - 4a + 8}$

***Exercise* #2:** Boiling water at 212 degrees Fahrenheit is left in a room that is at 65 degrees Fahrenheit and begins to cool. Temperature readings are taken each hour and are given in the table below. In this scenario, the temperature, T, is a function of the number of hours, h.

h (hours)	0	1	2	3	4	5	6	7	8
$T(h)$ ($^\circ F$)	212	141	104	85	76	70	68	66	65

(a) Evaluate $T(2)$ and $T(6)$.

h

$T(2) = 104$ $T(6) = 68$

100

(b) For what value of h is $T(h) = 76$?

$T(h) = 76$

$\boxed{h = 4}$

(c) Between what two consecutive hours will $T(h) = 100$?

Between hours 2 and 3.

$2 < h < 3$

***Exercise* #3:** The function $y = f(x)$ is defined by the graph shown below. Answer the following questions based on this graph.

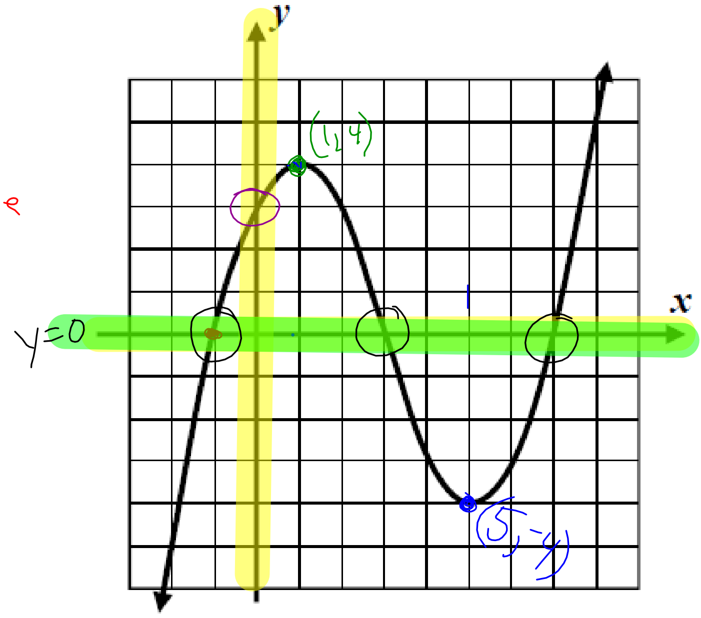
(a) Evaluate $f(-1)$, $f(1)$, and $f(5)$.

f(-1) means "what is y-value when x = -1?"

$f(-1) = 0$

$f(1) = 4$

$f(5) = -4$



(b) Evaluate $f(0)$. What special feature on a graph does $f(0)$ always correspond to?

$f(0) = 3$ y-intercept

(c) What values of x solve the equation $f(x) = 0$? → what is the x-value when y = 0?

What special features on a graph does the set of x-values that solve $f(x) = 0$ correspond to?

- x-intercepts
- roots / zeros / solutions

$\boxed{@\ x = -1, 3, 7}$

(d) Between what two consecutive integers does the largest solution to $f(x) = 3$ lie?